

$$\frac{d}{dt} \left( \frac{\partial L}{\partial \dot{x}} \right) = \frac{\partial L}{\partial x}$$

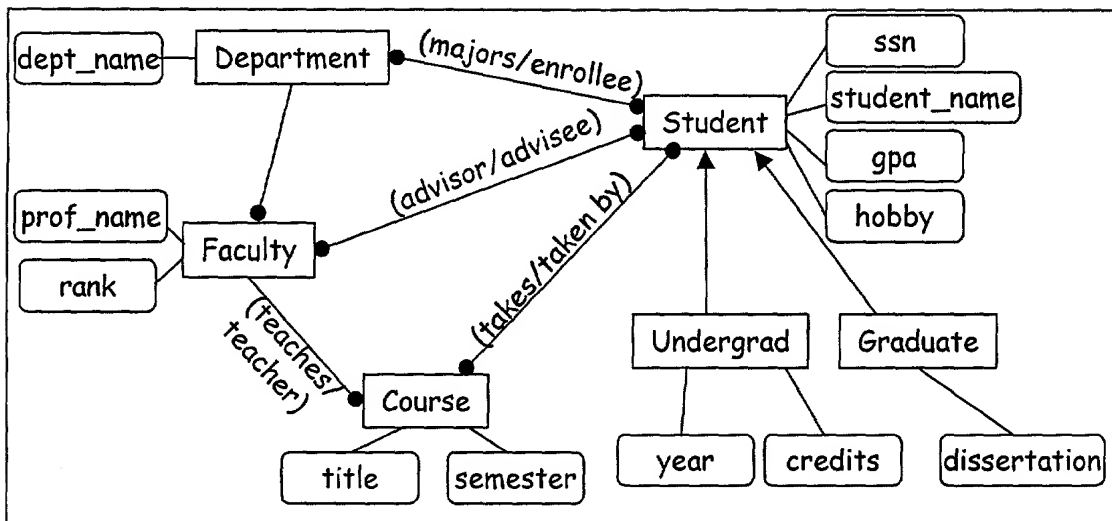


Fig. 2

#### Advisor to Generic Mappings

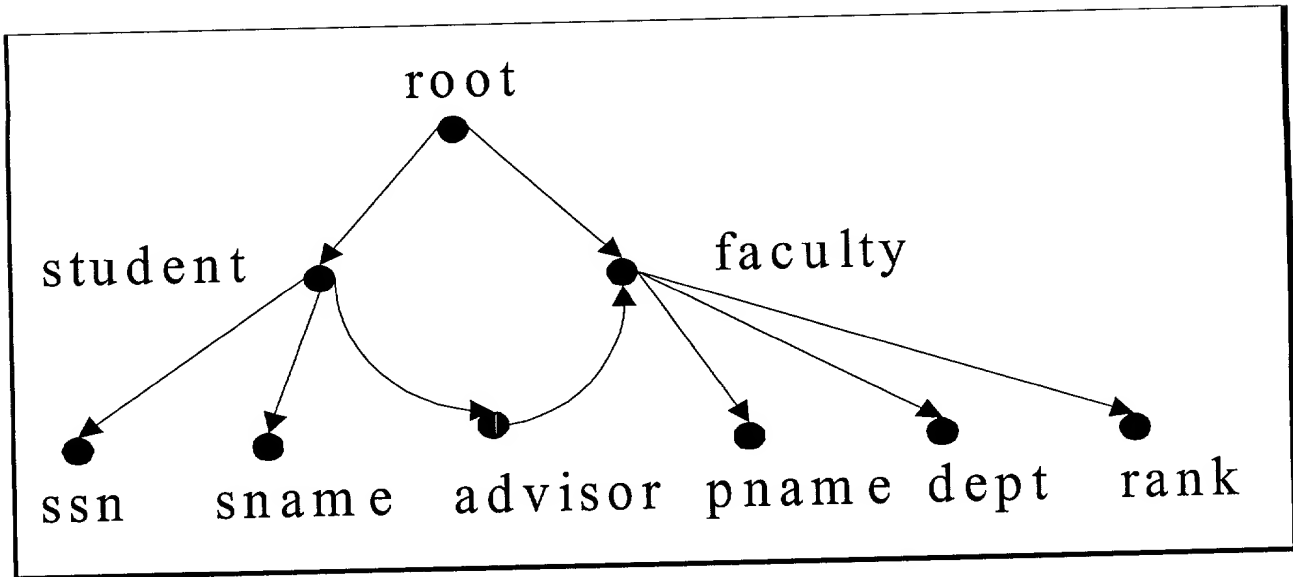
1.  $\Phi (\Pi_{\text{dissertation\_advisor}}(\text{Advisor})) \Rightarrow \Pi_{\text{advisor.prof\_name}}(\sigma_{\text{dissertation} \neq \text{NULL}}(\text{Generic}))$
2.  $\Phi (\Pi_{\text{CS\_student}}(\text{Advisor})) \Rightarrow \Pi_{\text{student\_name}}(\sigma_{\text{major.dept\_name} = \text{'CS'}}(\text{Generic}))$
3.  $\Phi (\Pi_{\text{good\_student}}(\text{Advisor})) \Rightarrow \Pi_{\text{student\_name}}(\sigma_{\text{gpa} \geq 3.5}(\text{Generic}))$
4.  $\Phi (\Pi_{\text{poor\_student}}(\text{Advisor})) \Rightarrow \Pi_{\text{student\_name}}(\sigma_{\text{gpa} < 2.5}(\text{Generic}))$
5.  $\Phi (\Pi_{\text{prof\_rank}}(\text{Advisor})) \Rightarrow \Pi_{\text{rank}}(\sigma_{\text{dept\_name} = \text{'CS'}}(\text{Generic}))$

#### Scheduler to Generic Mappings

6.  $\Phi (\Pi_{\text{CS\_student}}(\text{Scheduler})) \Rightarrow \Pi_{\text{student\_name}}(\sigma_{\text{teacher.dept\_name} = \text{'CS'}}(\text{Generic}))$
7.  $\Phi (\Pi_{\text{good\_student}}(\text{Scheduler})) \Rightarrow \Pi_{\text{student\_name}}(\sigma_{\text{gpa} \geq 3.3}(\text{Generic}))$
8.  $\Phi (\Pi_{\text{poor\_student}}(\text{Scheduler})) \Rightarrow \Pi_{\text{student\_name}}(\sigma_{\text{gpa} < 2.0}(\text{Generic}))$
9.  $\Phi (\Pi_{\text{lucky\_student}}(\text{Scheduler})) \Rightarrow \Pi_{\text{student\_name}}(\sigma_{\text{teacher.rank} = \text{'Full'}}(\text{Generic}))$

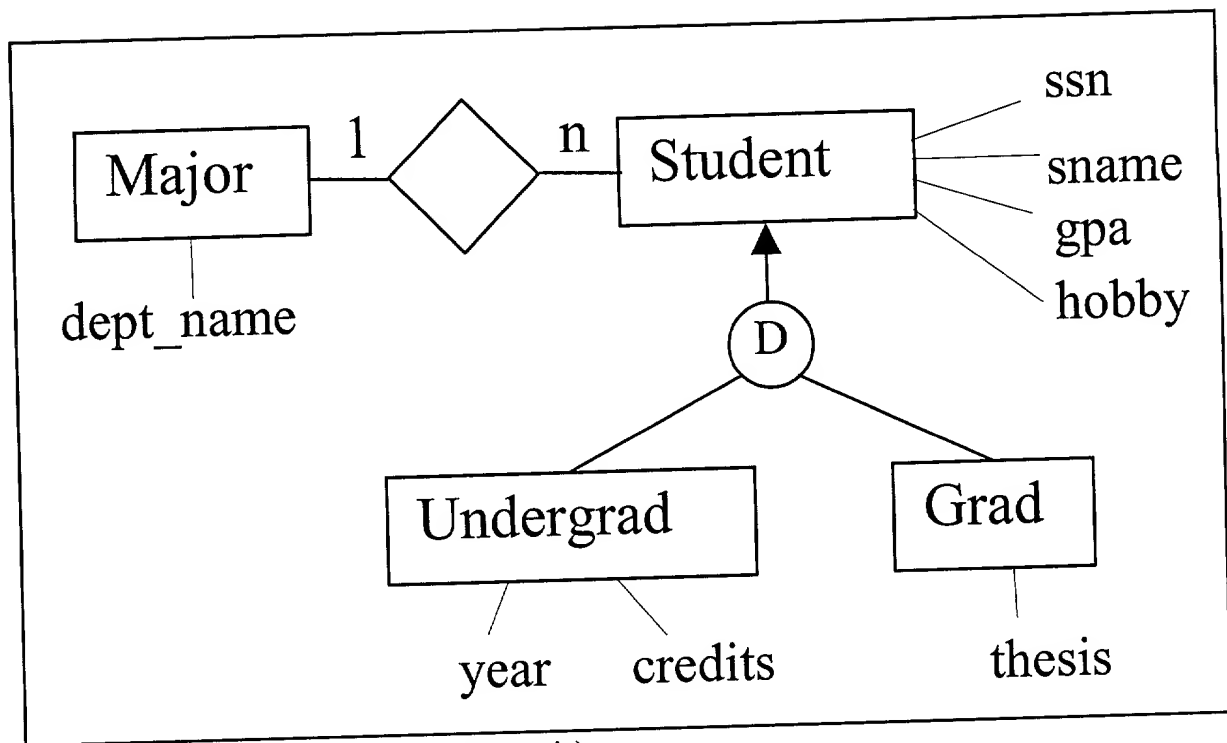
Figure 3. Inter-Domain Mappings

Fig. 3



$\Phi(\Pi_{\text{sname}}(\text{XML})) \Rightarrow \Pi_{\text{student\_name}}(\text{Generic})$   
 $\Phi(\Pi_{\text{dept}}(\text{XML})) \Rightarrow \Pi_{\text{dept\_name}}(\text{Generic})$   
 $\Phi(\Pi_{\text{pname}}(\text{XML})) \Rightarrow \Pi_{\text{advisor.prof\_name}}(\text{Generic})$

Fig. 4



$\Phi (\Pi_{\text{sname}}(\text{Grades})) \Rightarrow \Pi_{\text{student\_name}}(\text{Generic})$

$\Phi (\Pi_{\text{dept}}(\text{Grades})) \Rightarrow \Pi_{\text{dept\_name}}(\sigma_{\text{major.dept\_name}='CS'}(\text{Generic}))$

Fig. 5

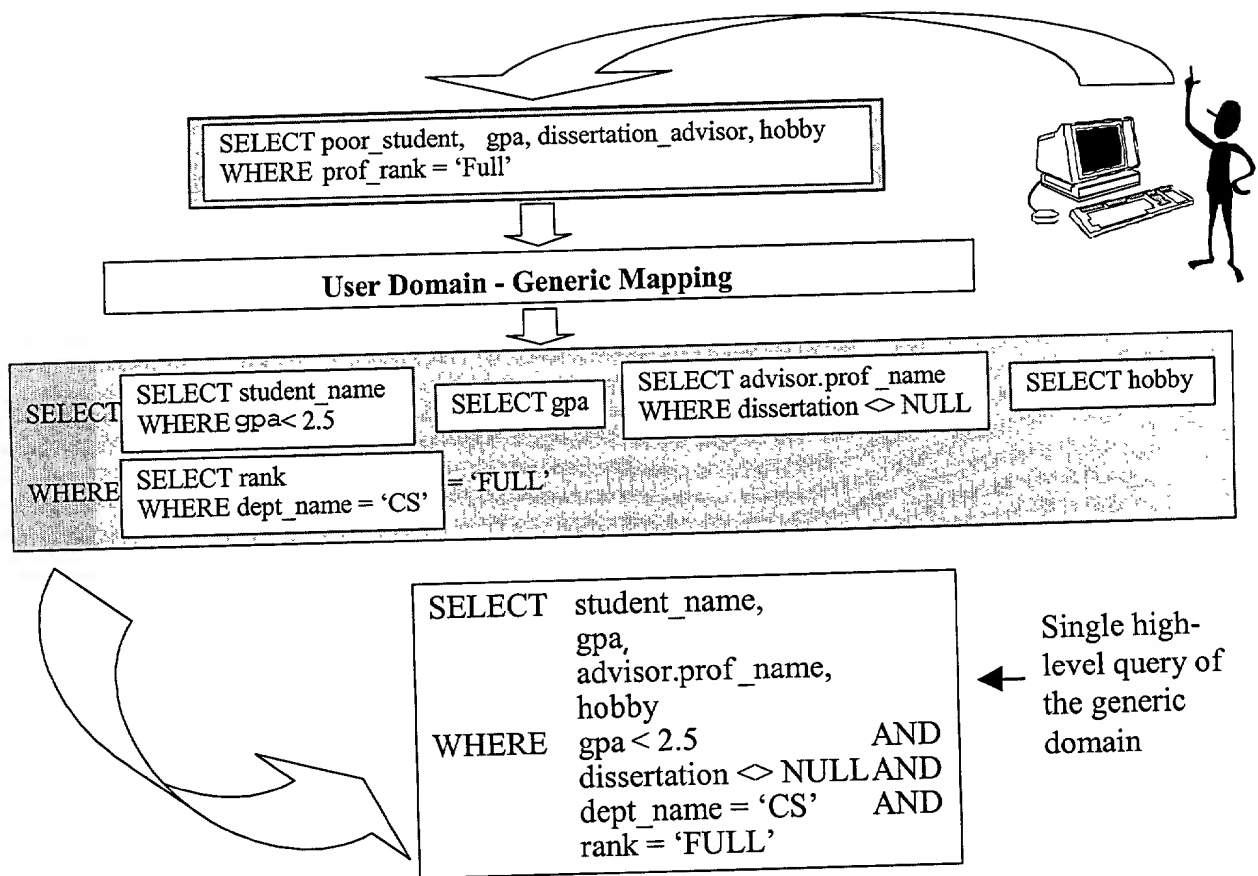
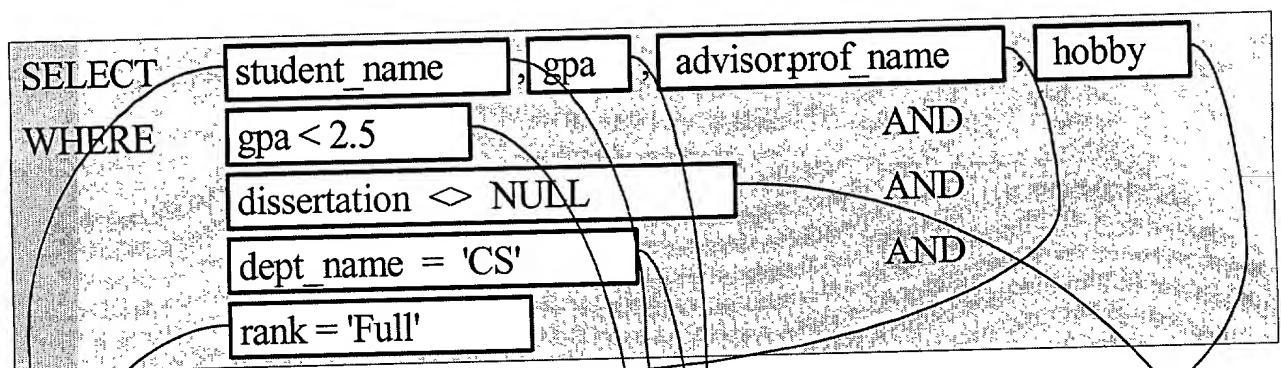
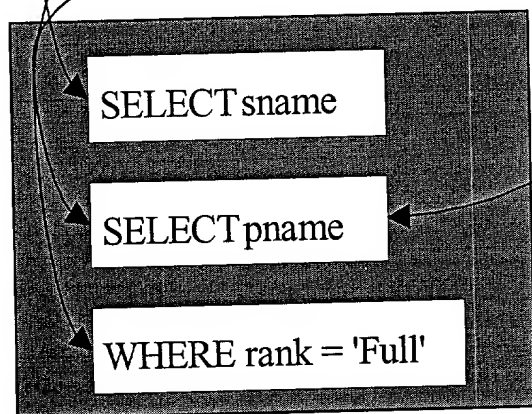


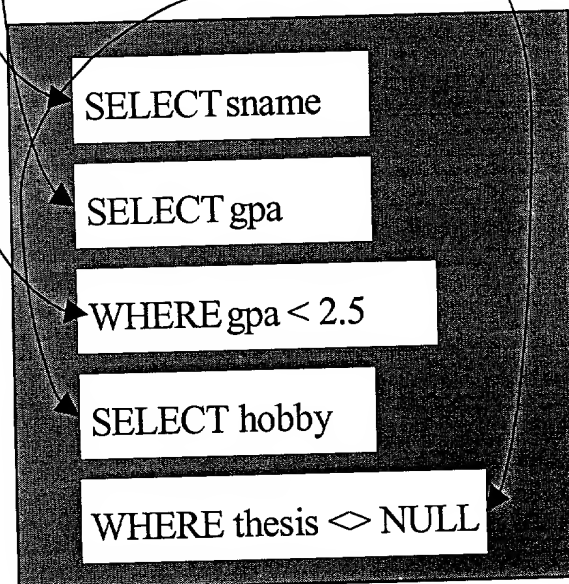
Fig. 6



### Generic - Data Source Domain Mapping



High-level query  
to the XML  
Document Set



High-level query  
to the Grade  
Database

Fig. 7

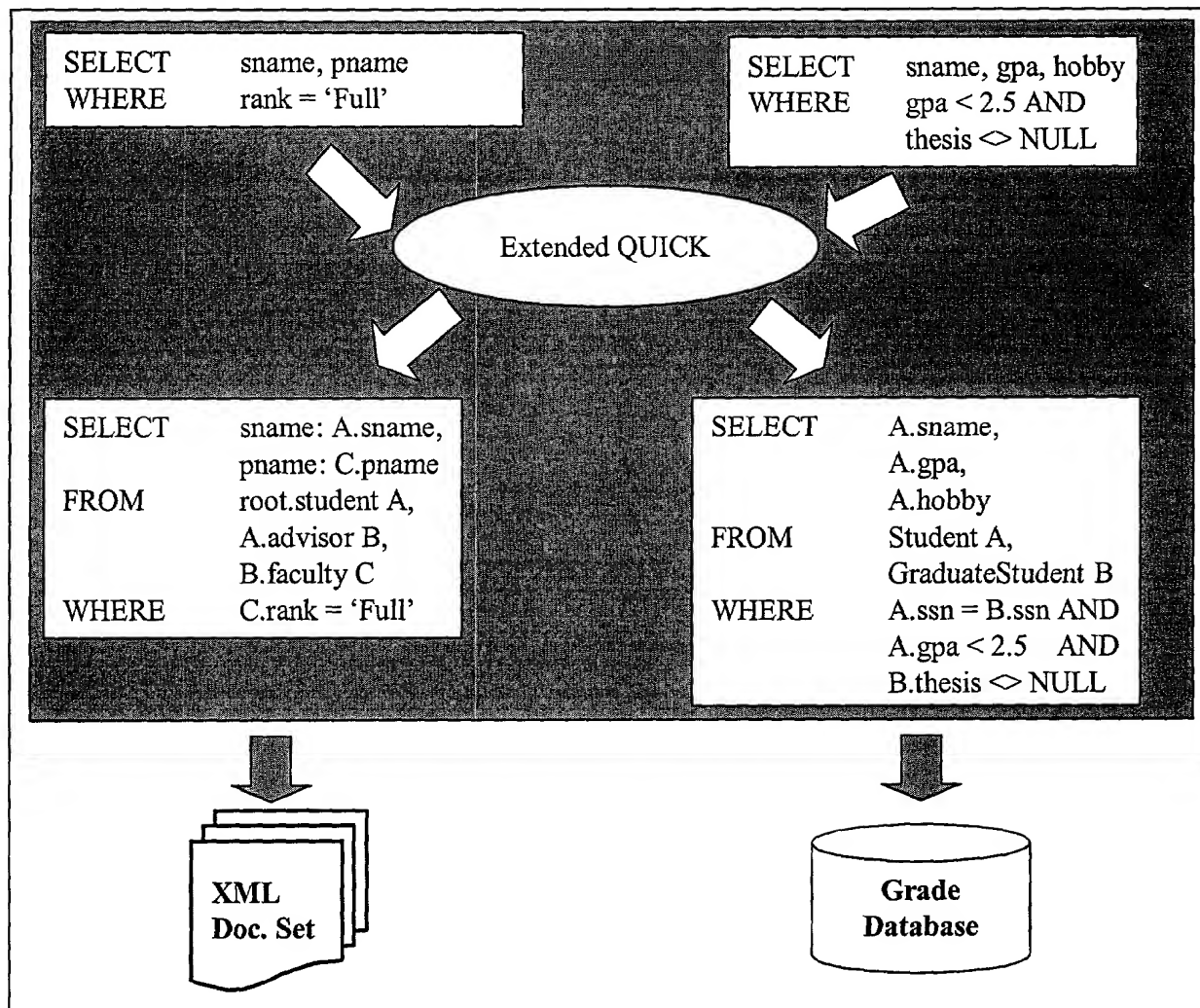


Fig. 8

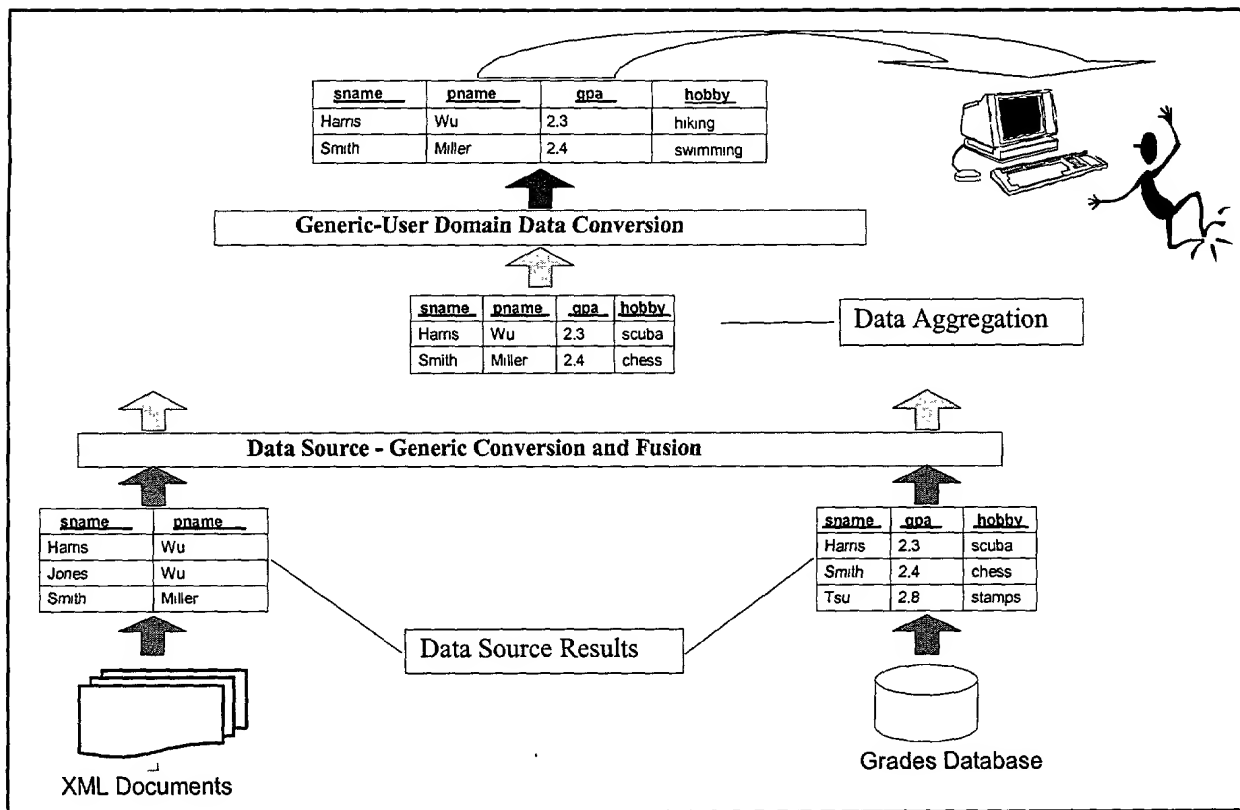


Fig. 9

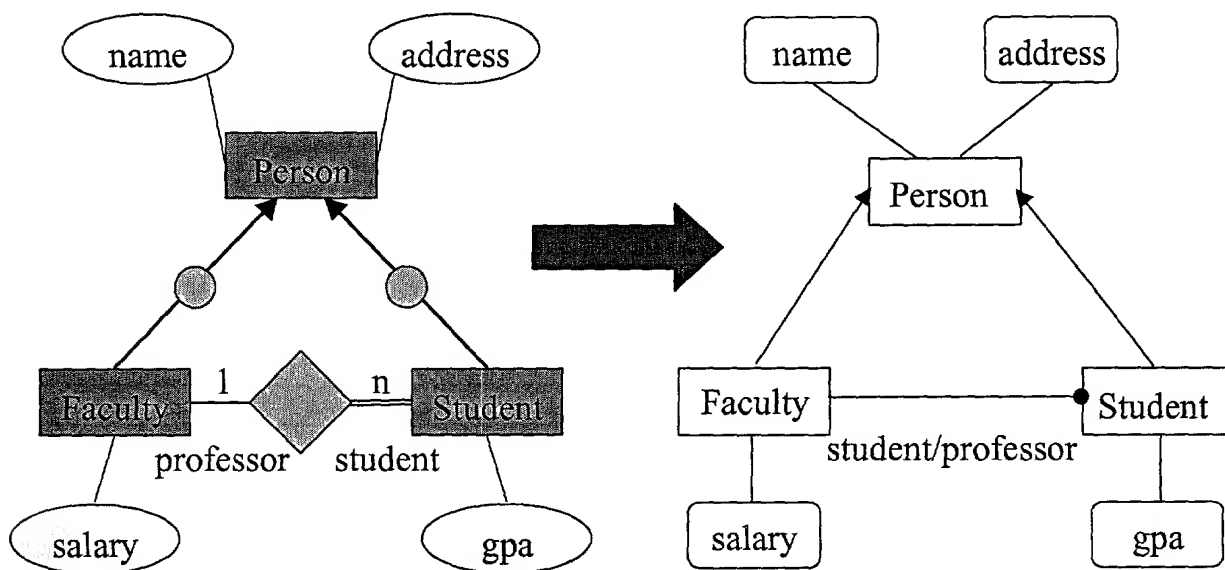


Fig. 10



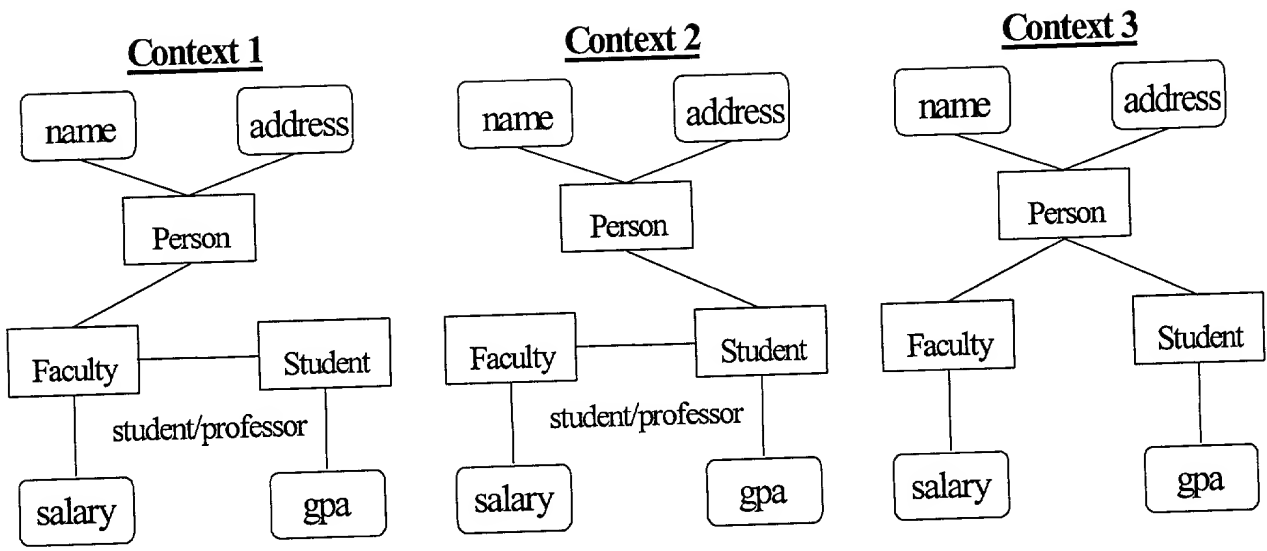
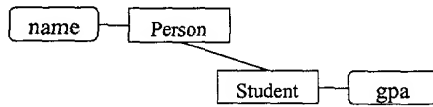


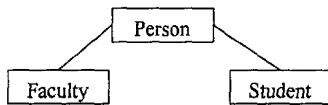
Fig. 11

#### Context for student role (from context 1)



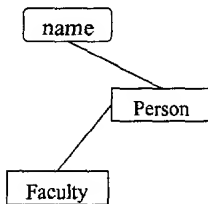
```
SELECT  P1.name
FROM    person AS P1
        NATURAL JOIN student AS S1
        ON P1.name = S1.student_name_fk
WHERE   S1.gpa >= 3.5
```

#### Context for professor role (from context 3)



```
FROM    faculty AS F1
        NATURAL JOIN person AS P2
        ON P2.name = F1.faculty_name_fk
        NATURAL JOIN student AS S2
        ON P2.name = S2.student_name_fk
```

#### Context for professor's professor role (from context 2)



```
SELECT  P3.name
FROM    faculty AS F2
        NATURAL JOIN person as P3
        ON P3.name = F2.faculty_name_fk
```

#### Bridge between student and professor roles

```
FROM    student AS S1                // from student role
        RIGHT OUTER JOIN faculty AS F1 // from professor role
        ON S1.student_professor_name_fk = // bridge
        F1.faculty_name_fk
```

#### Bridge between professor and professor's professor roles

```
FROM    student AS S2                // from professor role
        RIGHT OUTER JOIN faculty AS F2 // from professor's professor role
        ON S2.student_professor_name_fk = // bridge
        F2.faculty_name_fk
```

Figure 12. Contexts and Query Fragments

Fig. 12

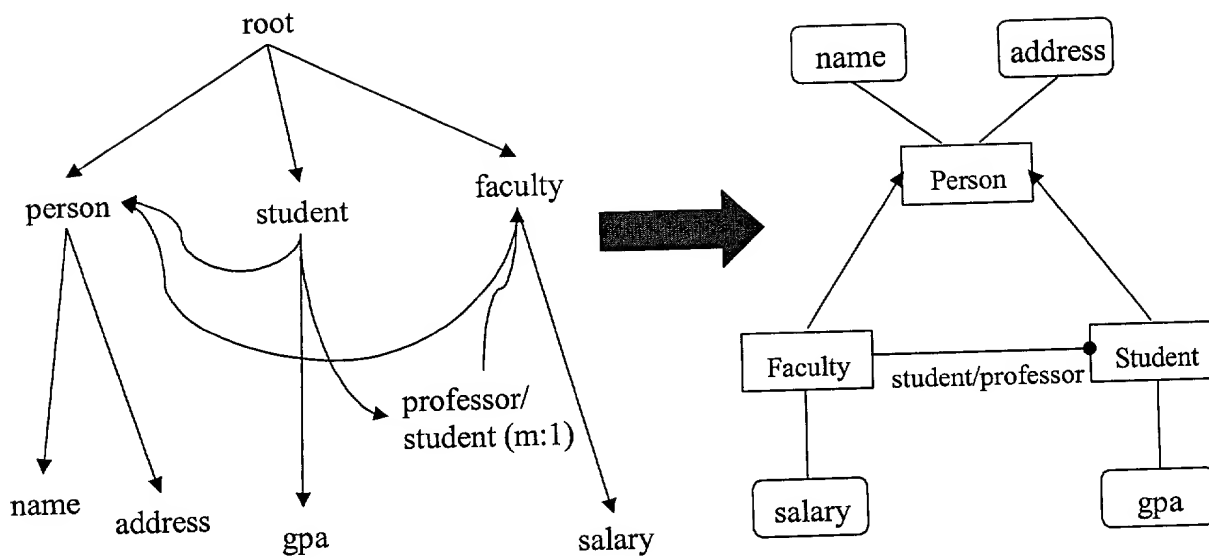


Fig. 13

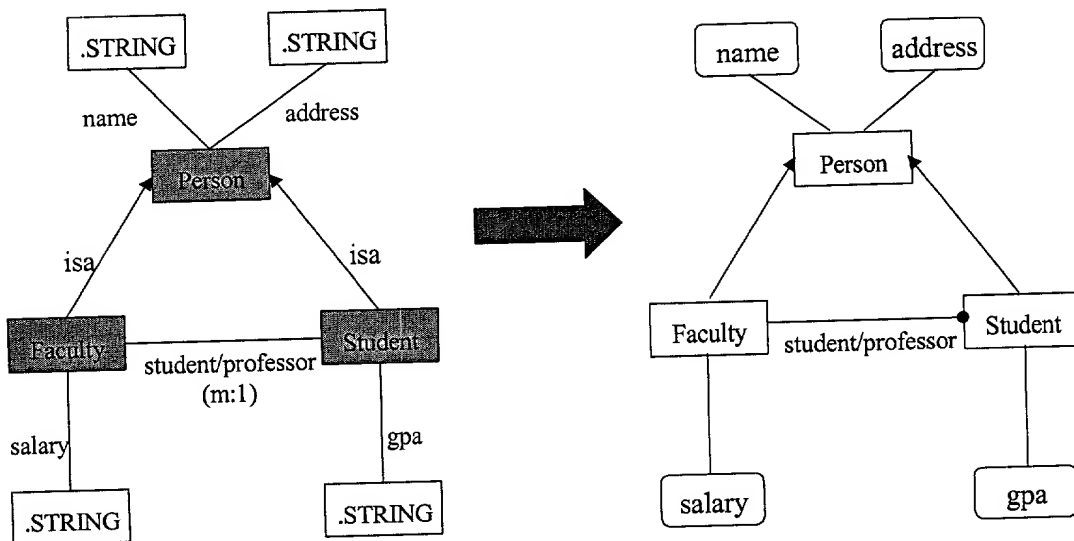


Fig. 14

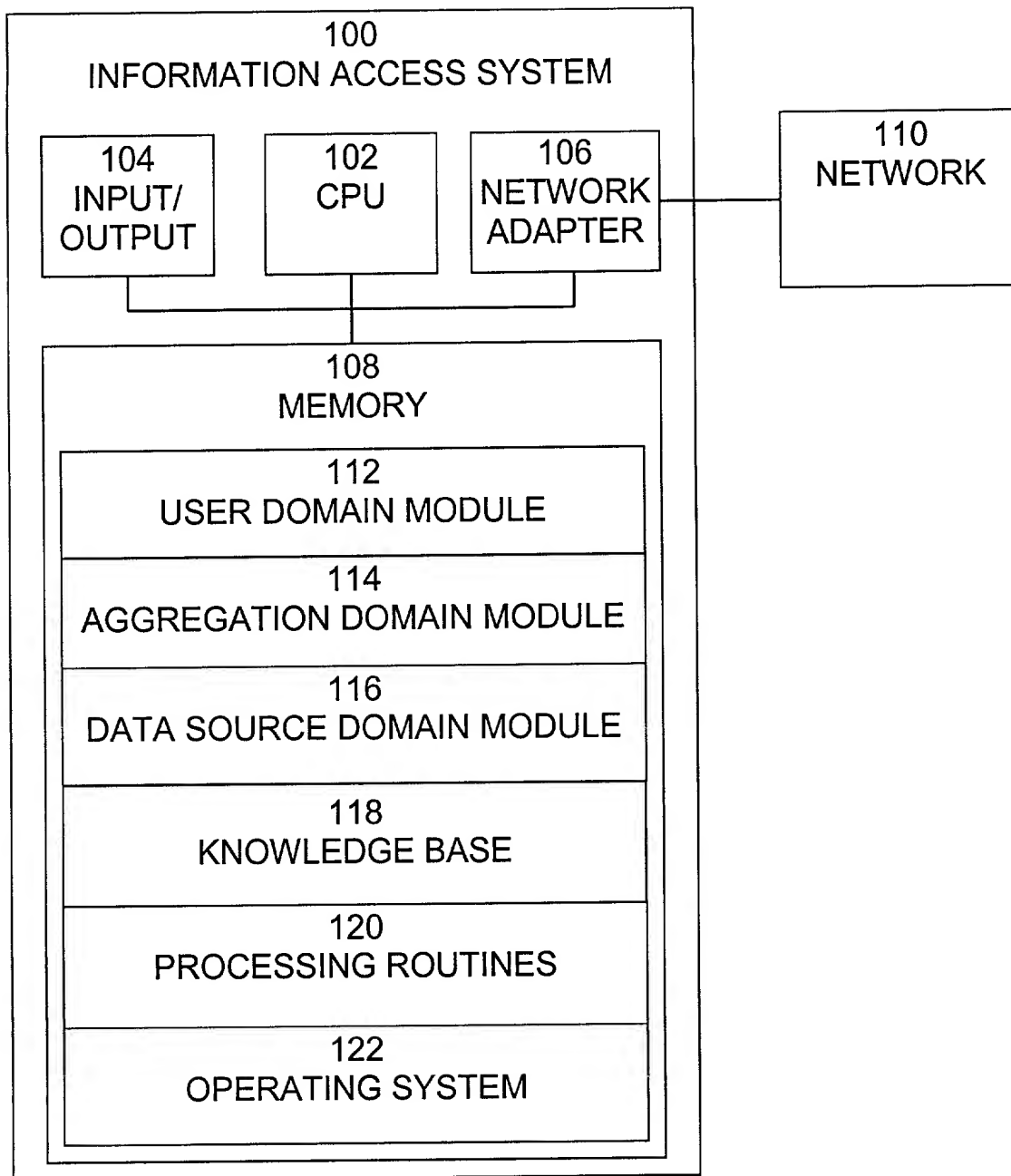


Fig. 15